WE CLAIM:

1. An apparatus for moving seeds, comprising:

a first probe configured to move in three-dimensional space, the first probe being fluidly connectable to a vacuum source and having an air-pervious end surface, wherein application of a vacuum from the vacuum source to the first probe is effective to cause the end surface to pick up a plurality of seeds at a selected first position and hold the plurality of seeds against the end surface, and wherein release of the vacuum from the first probe causes the end surface of the first probe to release the seeds at a selected second position; and

a second probe configured to move in three-dimensional space, the second probe being fluidly connectable to a vacuum source and having an apertured end surface, wherein application of a vacuum from the vacuum source to the second probe is effective to cause the end surface of the second probe to pick up a selected number of seeds at the second position and hold the selected number of seeds against the end surface of the second probe, and wherein release of the vacuum from the second probe causes the end surface of the second probe to release the selected number of seeds at a selected third position.

2. The apparatus of claim 2 further comprising a cover-removal manipulator configured to remove and replace a cover on a container containing the seeds.

3. The apparatus of claim 2 wherein the first probe, the second probe and the cover-removal manipulator are carried by a robotic assembly configured to move in three-dimensional space.

4. The apparatus of claim 1 further comprising a control unit for controlling the movement of the first and second probes to selected positions in three-dimensional space.

5. The apparatus of claim 1, further comprising a seed-dispersing container for receiving a plurality of seeds from one or both of the first and second probes, wherein when the plurality of seeds are deposited in the seed-dispersing container, the seeds are caused to disperse and form an array along a surface of the seed-dispersing container.

6. The apparatus of claim 5, wherein the seed-dispersing container is configured to form a substantially linear array of seeds.

7. The apparatus of claim 5, wherein the seed-dispersing container has a generally V-shaped cross-section and the end surfaces of the probes are substantially V-shaped to correspond to the cross-sectional shape of the seed-dispersing container.

8. The apparatus of claim 1 further comprising a plurality of planting chambers for receiving seeds from one or both of the first and second probes.

9. The apparatus of claim 8 further comprising a plurality of indicating elements for placing in any planting chambers that do not contain any seeds.

10. The apparatus of claim 1, further comprising a vacuum-sensing device operatively connected to the second probe for sensing the vacuum in the second probe for detecting whether the end surface of the second probe has picked up any seeds.

11. A robotic apparatus for moving seeds, comprising:

a robotic assembly configured to move in x, y and z directions that are mutually perpendicular to each other; and

a seed manipulator carried by the robotic assembly, the seed manipulator being positionable by the robotic assembly at selected x-y-z positions, the seed manipulator comprising a first probe and a second probe, the first probe having an air-pervious end surface adapted to pick up onto the surface one or more seeds, the second probe having an air-pervious end surface adapted to pick up onto its respective end surface one or more seeds, the first and second probes being movable independently of each other in a generally vertical direction;

the first probe being connectable to a vacuum source, wherein whenever vacuum is applied to the first probe and its respective end surface is positioned at a selected x-y-z position proximate to a population of seeds, the first probe picks up one or more seeds from the population; and

the second probe being connectable to a vacuum source, wherein whenever vacuum is applied to the second probe and its respective end surface is positioned at a selected x-y-z position proximate to a population of seeds, the second probe picks up one or more seeds.

12. The apparatus of claim 11, wherein the end surface of the second probe comprises an apertured end surface defining a selected one or more number of apertures, wherein application of the vacuum to the second probe is effective to cause the apertured end surface to pick up a selected number of seeds approximately corresponding to the number of apertures.

13. The apparatus of claim 12, wherein the number of apertures is one.

14. The apparatus of claim 12, wherein the apertures individually are about 100 to 150 microns in diameter.

15. The apparatus of claim 12, further comprising a control unit operatively connected to the robotic assembly and configured to control movement of the seed manipulator to selected positions in three-dimensional space.

16. An apparatus for moving seeds, comprising:

a seed-alignment container that causes seeds deposited therein to form an array of seeds; and

a seed manipulator configured to pick up a plurality of seeds from a population of seeds and deposit said plurality of seeds into the seed-alignment container, the seed manipulator also being configured to pick up a one or more seeds from the seed-alignment container and deposit said one or more seeds at a selected position.

17. The apparatus of claim 16, wherein the seed manipulator comprises a first probe and a second probe, the first probe having an air-pervious end surface configured to pick up the plurality of seeds whenever vacuum is applied to the probe and the end surface is positioned proximate the population of seeds, the second probe having an air-pervious end surface configured to pick up said one or more seeds from the seed-alignment container whenever vacuum is applied to the second probe and its respective end surface is positioned proximate said one or more seeds.

18. The apparatus of claim 17, wherein the first and second probes are independently movable with respect to each other in a generally vertical direction.

19. The apparatus of claim 17, wherein the end surface of the first probe comprises a mesh screen.

20. The apparatus of claim 17, wherein the end surface of the second probe defines a selected number of apertures approximately corresponding to the number of seeds to be removed from the seed-alignment container.

21. The apparatus of claim 20, wherein the end surface of the second probe is non-planar and is shaped to generally correspond to a non-planar surface of the seed-alignment container to facilitate the removal of seeds therefrom.

22. The apparatus of claim 16, further comprising a robotic apparatus configured to move the seed manipulator to selected positions to pick up the plurality of seeds, deposit the plurality of seeds into the seed-alignment container, pick up said one or more seeds from the seed-alignment container, and deposit said one or more seeds at the selected position.

23. An apparatus for planting seeds, comprising:

a robotic assembly configured to move in three-dimensional space;

a plurality of donor containers, each containing a respective population of seeds and positioned at a respective location in three-dimensional space;

a plurality of planting chambers for receiving seeds from one or more donor containers, each planting chamber being positioned at a respective location in three-dimensional space; and

a seed manipulator carried by the robotic assembly and operable to pick up seeds and release seeds;

the robotic assembly being configured to position the seed manipulator at a plurality of different locations in three-dimensional space so as to allow the seed manipulator to remove

seeds from the donor containers and to position the seed manipulator at a plurality of different locations in three-dimensional space so as to allow the seed manipulator to deposit one or more seeds into one or more planting chambers.

24. The apparatus of claim 23, wherein the seed manipulator comprises at least one probe that is fluidly connectable to a vacuum source, wherein application of a vacuum to the probe is effective to cause a surface of the probe to pick up seeds.

25. The apparatus of claim 24, wherein the at least one probe comprises a first probe and a second probe that are movable relative to each other in a generally vertical direction, each probe being fluidly connectable to a vacuum source, wherein selective application of a vacuum from the vacuum source to the probes is effective to cause the respective end surfaces of the probes to pick up seeds.

26. The apparatus of claim 23, further comprising a control unit operatively connected to the robotic assembly and to the seed manipulator, the control unit being configured to cause the robotic assembly to move the seed manipulator to selected locations in three-dimensional space, to activate the seed manipulator to pick up seeds at selected locations, and to deactivate the seed manipulator to deposit picked-up seeds at selected locations.

27. The apparatus of claim 23, further comprising a container that causes seeds to form an array of seeds when seeds are deposited into the container.